National Aeronautics and Space Administration
**Lyndon B. Johnson Space Center**
Houston, Texas

## American heritage

The week-long celebration heralding the diverse cultures at JSC is captured in pictures. Photos on Page 3.

## What's for dinner

The Mir 22 crew check out food that will be available on the Russian outpost. Photo on Page 4.

# Space News Roundup

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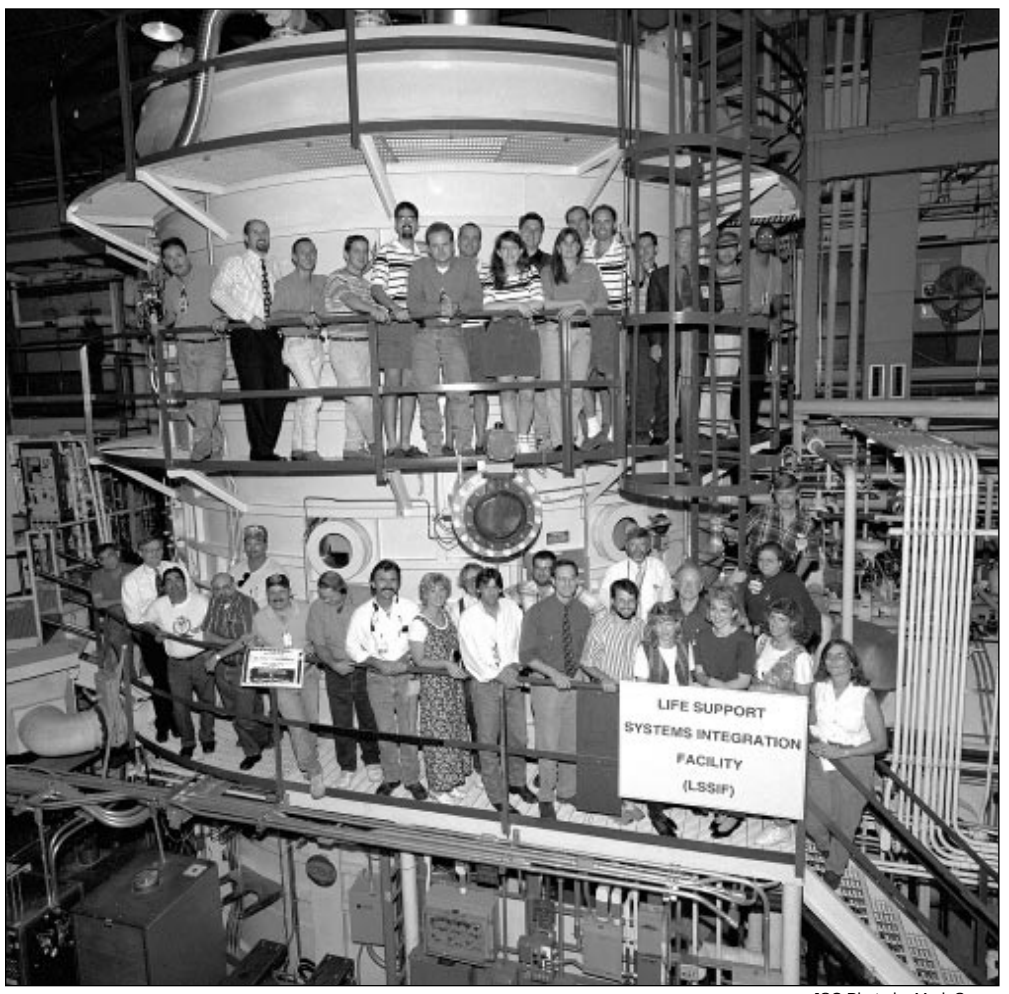


JSC Photo by Mark Sowa

**The Advanced Life Support Team takes a moment outside the regenerable life support test chamber before saying good-bye to co-workers who are scheduled to spend more than 30 days sealed inside the chamber. Below: The four test members from left are, Katy Hurlburt, Doug Ming, John Lewis and Pat O'Rear.**

## *Four JSC volunteers living off recycled air, water in chamber*

Four JSC employees were recently sealed into a special, air-tight chamber to help further the studies of recyclable life support systems.

Doug Ming, test crew lead and space scientist; John Lewis, lead engineer, Pat O'Rear, lead electrical engineer and Katy Hurlbert an aerospace engineer and thermal systems expert, have been living inside the three-story, 20-foot diameter chamber 24 hours a day since June 12 and plan to remain there until July 12. Mechanical and chemical means are being used to recycle all air and water—including urine—for the four people in the chamber.

The current test follows a one-person test conducted in August 1995 which used a crop of wheat plants to recycle the test subject's breathing air. Two additional tests are planned for 1997, a 60-day and 90-day test with the latter using both plants and physiochemical means for recycling air and water.

"This test expands on last year's investigation extensively—studying totally different technologies, physiochemical rather than biological—on a scale more than four times greater," said Don Henniger, chief scientist for regenerative life support systems. "Regerable life support is a critical enabling technology for the future of humans in space. Without it, trips to Mars or the Moon to establish bases are simply impossible. You just cannot carry all of the supplies needed for such long voyages."

Look for complete details of the test in next week's Space News Roundup.

# STS-78 marathon mission continues to run smoothly

**By Karen Schmidt**

Life and microgravity science continues onboard *Columbia* as the STS-78 crew conducts experiments on what could become the longest shuttle flight in history.

The focus of the marathon mission is to determine the effects of long-duration space flight on humans and materials. Mission managers are expected to decide later in the mission whether to extend STS-78 to 17 days, making it the longest shuttle mission to date.

"This mission probably captures better than any other in the past what the future space station operations are going to look like," said Payload Commander Susan Helms. "We've got a dual mission going on here. We've got a full-up microgravity flight, with furnaces and the Bubble Drop Particle Unit going around the clock. In addition, we've got the life science experiments. The fact that we're doing these microgravity experiments and life science experiments concurrently, and they're actually two missions combined into one, is what space station is going to be about.

"Space station isn't designed to just one objective; its got many objectives. This is really the first flight where we've combined two major objectives to see if they're compatible. I think that when we get back and look at the data, we will see that we've been extremely successful in demonstrating that, and that bodes well for space station," Helms said.

Helms and her crew mates—Commander Tom Henricks, Pilot Kevin Kregel, Mission Specialists Rick Linnehan and Chuck Brady and Payload Specialists Jean-Jacques Favier and Bob Thirsk—completed their first week in orbit Thursday and continue to study the effects of microgravity on humans.

Some of this week's science investigations have centered around the crew. Physiology studies on muscles, sleep patterns, mental and physical functions will help determine the effects of space on station crew members.

Four crew members Brady, Linnehan, Favier and Helms—wore sensors for 24 hours to monitor muscle activity. Team members took turns on the Torque Velocity Dynamometer to exercise and record precise data on muscle strength, power and endurance. Crew members also measured lung performance during rest and exercise to understand how gravity effects the pulmonary system.

Early this week, research focused on sleep patterns, and its impact of those patterns on crews' mental and physical functions.

"It's very important as missions get longer that we understand sleep in space and how it can become disrupted," said Principal Investigator Timothy Monk. "When we're thinking about manning a space station or long-duration missions to other planets, we really have to take seriously the fact that we're removing ourselves from a planet with a 24-hour rotation we all evolved on. We are now in a situation where our biological clock might be doing the wrong thing, interfering with our ability to sleep at night and performing well during the day."

Crew members wear belt packs that measure temperature and sleep caps to record brain waves, eye movements and muscle tone. Measurements are taken in 72-hour intervals during the mission.

"We are asking the astronauts to record their circadian rhythms and various body functions and chemicals in their urine, and their alertness," Monk said.

Other physiological experiments include the inner ear canal and otolith studies. Helms, Linnenhan, Thirsk and Favier are wearing modified ski goggles that record eye and head movement as they track targets on the goggles' surface. Thirsk, Favier, Brady and Linnehan also donned electrodes and sensors early in the mission to study motion sickness. The Torso Rotation Experiment analyzes movements and may lead to practical ways to avoid motion sickness on Earth.

"To give you an example of some of the symptoms people can experience, the body experiences a major fluid shift immediately after ascent is complete, and this fluid shift can bring on a lot of strange symptoms such as fullness of the head, stuffy nose, stomach awareness and headaches," Helms said. "As it goes on people get used to it and they adapt to zero-g usually within hours. In our case everybody here adapted very quickly."

While the majority of their time was spent on life sciences, the crew conducted several material science experiments as well. Metals

Please see **MATERIALS** , Page 4

# Blaha prepares for Mir stay

Cosmonaut Researcher John Blaha spoke this week about his upcoming stay on the Mir Space Station as Shannon Lucid chalks up her 97th day on the Russian outpost.

In a news conference Wednesday at the Gagarin Cosmonaut Training Center in Star City, Russia, Blaha, with his Mir 22 crew mates Commander Gennady Manakov, Flight Engineer Pavel Vinogradov and French Cosmonaut Researcher Claudie Andre-Deschays, talked about the difficulties of an international crew.

"Naturally difficulties do exist in this program, but I am happy to participate," Blaha said. "This program will be a new page not only in space exploration but also in the interrelation between countries."

Manakov, Vinogradov and Andre-Deschays are scheduled to be launched in a Soyuz TM-24 capsule from the Baikonur Cosmodrome in Kazakhstan on Aug. 14 and will dock to the Mir on Aug. 16 to begin what is expected to be a six-month mission. Blaha will already be aboard Mir, having been transported to the space station aboard *Atlantis* on the STS-79 mission, which is tentatively scheduled for launch July 31. Blaha will spend about four months on Mir, replacing Lucid, who has been part of the Mir 21 crew since March. The STS-79 crew—Commander Bill Readdy, Pilot Terry Wilcutt and Mission Specialists Tom Akers, Jay Apt and Carl Walz will return to Earth with Lucid around Aug. 9.

"All three parties involved in this program did a good job," said Gen. Yuri Glazkov, deputy chief of the GCTC. "This is a big accomplishment not only for the crew members but the training personnel also shared a good mutual understanding."

Blaha spent the majority of last week in medical examinations in preparation for this week's chief medical commission and certification for space flight. He also was involved in several baseline data collection sessions for the Skeletal Muscle Performance and Characteristics Experiment. Mir 22 Backup Jerry Linenger participated in the same medical exams and BDC sessions as Blaha. He and Blaha also completed a four–hour simulation in the Mir module.

Meanwhile, Lucid continues to conduct microgravity and life science experiments

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JSC Photo Mark Sowa

**STS-79 Mission Specialist Jay Apt, right, and Suit Technician John Hopkins of Lockheed Martin help out IMAX producers during crew escape training.**

# JSC employees to receive NASA's biggest honors

NASA astronauts are among the employees who will receive the agency's highest honors in a ceremony to be held at 3 p.m. July 9 in Teague Auditorium.

This year's ceremony will honor individuals and groups nominated by center management and selected by the Incentive Awards Board at NASA Headquarters to receive NASA's highest honorary awards.

Each recipient of a NASA medal also will be presented with a framed certificate signed by NASA Administrator Daniel S. Goldin. Individuals selected to receive Group Achievement Awards on their team's behalf will receive a certificate at the ceremony. Certificates for individual participants of teams will be forwarded to the nominating organizations. NASA's Deputy Director John Dailey and JSC's Deputy Administrator James Wetherbee, will assist JSC Director George Abbey in presenting the awards.

The NASA Distinguished Service Medal will be presented to Kenneth Cameron, Bonnie Dunbar, Robert Gibson, Jerry Ross, William Shepherd, Norman Thagard, Kathryn

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